AMERICAN OIL COMPANY

GENERAL OFFICE 910 SOUTH MICHIGAN AVENUE CHICAGO, ILLINOIS 60680

ELECTRONIC DATA PROCESSING DEPARTMEN

OMER C. LUNSFORD
Manager
F. A. GITZENDANNER
Manager, Technical and Scientific Computing Division
C. H. YATES
Manager, Commercial Computing Division
T. A. HOEDL
Manager, Computer Operation and Communications Division

June 8, 1966

File: TC-36
Subject: Suggested ASCII Improvements for Programmers

Mr. Thomas B. Steel, Chairman X3.4
c/o Mr. Lynn Yarbrough
Asst. Director, Harvard Computing Center
33 Oxford Street
Cambridge, Massachusetts 02138

Dear Sir:

I am writing this letter to ASA Committee X3.4 as chairman of the SHARE Character Set Committee and as a programmer of computers.

The "Proposed Revised (1966) American Standard Code for Information Interchange" dated May 20, 1966 does not meet the needs of computer programmers! There are no characters in the international use section of center four column subset (2-5) which can be used satisfactorily to represent the logical operations OR and NOT. They are placed instead in positions 7/12 (vertical line) and 7/14 (overline) respectively. The alternatives of using exclamation point (2/1) for OR and circumflex (5/14) for NOT will not work. In mathematics the exclamation point is used to represent factorials, and the circumflex closely resembles the "inverted v" which in the past has often been used to represent the logical AND operation. Also, the circumflex is in the national use section.

I infer that the reintroduction of the reverse slant (5/12) was carried out so that the logical OR could be represented by reverse slant plus slant and the logical AND by slant plus reverse slant. This too is an unsatisfactory solution. First of all, the reverse slant is in the national use area. Secondly, this procedure would involve using two characters to represent each of these operations, and the shapes of these characters are such that many programming

CBI 67/1/23

errors might result.

Yesterday the SHARE PL/I Project voted unanimously in New York that the Vertical Line and the Overline be placed in the international usage section of the middle 64 character subset of ASCII. (That is, that they appear somewhere in columns 2-5 but not in positions 4/0 or 5/11-14.) At this SHARE session it was suggested that this could be accomplished by moving Vertical Line to 2/3, Number Sign to 5/12, Reverse Slant to 7/12, Overline to 2/4, Dollar Sign to 5/14, and Circumflex to 7/14.

From a practical standpoint, there are really only 59 character positions available for international interchange (middle 64 character subset minus the 5 national positions). I suggest that X3.2 and X3.4 sit down together and arrive at some reasonable compromise that puts all the needed programming symbols in these 59 positions. This is particularly important now in the light of current standardization studies for PL/I.

Personally, I am completely in favor of character set standardization. I have suffered as much as anyone in the past through the lack of such standards. However, let's come up with something that programmers can comfortably live with, particularly now that remote terminal devices will play an ever increasing role in computer processing.

Very truly yours,

H. W. Nelson

H. W. NELSON
Chairman, SHARE Character Set Committee

HWN/ka

cc: Mr. Paul B. Goodstat, Secretary X3
Mr. L. L. Griffin, Chairman X3.2
Mr. B. Faden, SHARE Administration Division Manager
Mr. P. Dorn, SHARE PL/I Project Chairman
Mr. James Tupac, SHARE Secretary (for SHARE Secretary's Distribution)

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
8621 GEORGIA AVENUE
SILVER SPRING, MARYLAND 20910

IONE
7100
9-7700
CODE 301

June 9, 1966

COPY

Mr. Philip A. Cramer (PL)
System Development Corporation
2500 Colorado Avenue
Santa Monica, California 90406

Dear Mr. Cramer:

On June 7, 1966, the PL/I Project resolved that:

> Graphics in PL/I remain as is, but the SHARE will work to have ASCII modified as follows in order to have all PL/I graphics in the center 64, and all operator graphics not in a National Use Position:

a.	Move	$	2/4	to	^	5/14
		^	5/14	to	¬	7/14
		¬	7/14	to	$	2/4
b.	Move	#	2/3	to	\	5/12
		\	5/12	to	|	7/12
		|	7/12	to	#	2/3

Thank you for taking the necessary action on this resolution.

Sincerely yours,

Philip H. Dorn (CAI)
Manager, PL/I Project

Original signed by:
Mary L. Douglas (AP)
Secretary, PL/I Project

MLD:mml

cc: Wm. Altmann (IBM)
Ted Climis (IBM)
A. P. Smith (IBM)
T. Titman (IBM)

CBI 81/20/1

attachment to Douglas + Little June 17, 1966

June 29, 1966

File X3.4

9 June 1966

On 18 May 1966 X3.2.4 approved unanimously the following paragraph as a recommended change to the draft of the revised ASCII standard:

> B 1.2 Within any particular equipment, system, or community of activity it may be necessary to substitute characters. For example, some systems may require special graphic symbols and some devices may require special control codes. (Design efforts on the standard code included consideration of these types of adaptations.) So-called "secular sets" produced by such substitutions, although not conforming to this standard, may nonetheless be consonant with it if the substitutions are made in accordance with the guidelines of section B2.

At its meeting on 19 May 1966, X3.2 rejected this substitution, preferring to retain the original wording:

> B 1.2 Within any particular equipment or closed system it may be necessary to substitute characters. For example, some systems may require special graphic symbols and some devices may require special control codes. Design efforts on the standard code included consideration of these types of adaptations.

X3.4 has already gone on record as accepting and endorsing the notion of secular sets (p 4 of the minutes of 43rd meeting of X3.4). X3.2.4 has obviously been most cooperative and courteous, both in extending an invitation to the Chairman of X3.4.2 for the purpose of allowing the notion of secular sets to be explained, and in endorsing unanimously the proposal rehearsed above.

X3.4~~, therefore,~~ wishes to go on record to X3 as objecting to the proposed revision of ASCII, ~~on the basis that the above-explicated substitution was not made.~~

Edited as adopted by X3.4

Peter Zilahy Ingerman
Chairman, ASA X3.4.2

ees

CBI 67/1/21?

IBM

Box 390, Poughkeepsie, N. Y. 12602
Telephone: 463-1234 (Code 914)
Direct Dialing No.: 463-2141

International Business Machines Corporation

June 15, 1966

Memorandum to: Mr. L. L. Griffin, Chairman, X3.2

Subject: X3.2 Ballot on pRASCII

IBM supports consistency between ISCII and ASCII codes and was prepared to vote YES. However, after receiving comments from several of our user groups we find compelling reasons for additional changes. These groups are aware that ASCII will become a useful American Standard and are concerned over the lack of certain programming graphics in the basic 64 character subset.

Because of the need of these necessary modifications, which will be described at your next meeting, I vote NO.

C. E. Mackenzie
Member, X3.2

CEM:w
Attachment

cc: Mr. J. L. Little, Chairman X3.2.4

CBI 67/1/23

X3.2/404

COMPUTER APPLICATIONS INCORPORATED

555 Madison Avenue • New York, N.Y. 10022 • PLaza 9-1310

June 15, 1966

Mr. C. A. Phillips
X 3 Chairman
Business Equipment Manufacturers Assoc.
235 East 42nd Street
New York, New York 10017

Dear Mr. Phillips:

While I am fully cognizant of the time and effort which has gone into the development of the published ASCII Card Code, I can not help but feel deeply disappointed in the outcome. As Dr. Nelson put it in his letter of June 8, 1966, "The (ASCII code)....does not meet the needs of computer programers!". Speaking both as an individual and as the Manager of the SHARE PL/I Project I could not agree more with Dr. Nelson.

The reverse slash (5/12) which I understand has been included in ASCII effective May 20, 1966, does little or nothing for programmers. I will not go into the price paid in programming for the omission of left arrow and up arrow. However, I must add my voice of protest to the inclusion of exclamation point (2/1) and circumflex (5/14).

Through this peculiar selection process one arrives at the quaint notion that a logical NOT will look like the mathematical AND, and that OR will be represented by the world-wide mathematical symbol for factorial. Interestingly, the ALGOL proposal by Wirth and Hoare which is in the same issue of the Communications as the ASCII article uses the classical symbols, $\wedge$, $\vee$ as well as $\neg$.

The PL/I character set which has been well known for two years or more is based on the vertical bar (|) and overline ($\neg$). It is vital that these characters be returned to the international usage section of the center 64; columns 2-5 less 4/0 and 5/11-14.

We deplore the use of double operators $\wedge$ (2/15, 5/12) or $\vee$ (5/12, 2/15) to represent a single mathematical operation. It does not appear to be practical from a programming sense, and given the sloppiness of most printers, will probably fail from the graphical sense.

CBI 67/1/[redacted] 21

I shall not waste your time and mine decrying the absence of such useful and long-established symbols as ↑, ≠, ≥, ≤ or ←. I have long since given up hope of ever having them.

Nevertheless, I can not stand idle while a character set totally hostile to the programming world is presented to the world as an American Standard. I would further suggest that if the programming community becomes sufficiently aroused, the pressure of user groups upon the manufacturers will lead eventually to an "every man for himself" position, i.e. chaos. I for one would rather be non-standard than reduced to impotence.

Yours very truly,

Philip H. Dorn

Philip H. Dorn (CAI), Manager
SHARE PL/I Project

PHD:eab

cc: Mr. Thomas B. Steel, Chairman X 3.4
Mr. Lynn Yarbrough
Dr. H. W. Nelson
Mr. Ben Faden
Mr. Elliott Nohr, X 3.4.2C
Mr. R. E. Rountree, National Bureau of Standards
Prof. Saul Gorn, University of Pennsylvania
Mr. John L. Little, Bureau of the Budget ✓
Mr. James Tupac for SDD X

X3.2/399

June 29, 1966

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON, D.C. 20234

June 16, 1966

IN REPLY REFER TO:

*

Mr. H. W. Nelson
Chairman, SHARE
Character Set Committee
American Oil Company
910 South Michigan Ave.
Chicago, Illinois 60680

Dear Mr. Nelson:

This is in response to your letter of June 8, 1966, to Mr. T. B. Steel, Chairman X3.4, a copy of which was addressed to me.

The sometimes conflicting requirements that ASCII and it's international counterparts, the ISO 7-bit code and CCITT proposed 7-bit alphabet, attempts to satisfy often do not result in the ideal solution for specific requirements. Collating order, historical pairing of characters on keyboards and national practices or requirements are some of the major influences on character placement in ASCII. These influences have been noted before and no doubt are well known to you. Let me, therefore, speak to the specific suggestions noted in your letter.

Position 2/3 in the code table is now occupied by the # symbol. The # symbol is second choice in the ISO and CCITT codes to be used in those countries who do not require the first choice pound (£) symbol. Moving the # symbol out of 2/3 would not, therefore, open up 2/3 for Vertical Line in the ISO or CCITT codes.

The $ symbol in 2/4 is also an international symbol in the ISO and CCITT codes. The previous version of the ISO code carried a note that position 2/4 was to be used for a national currency symbol and that 5/12 could be used for a second currency symbol. The countries who want the $ and £ object to their location in "national use" positions for the same reasons that programmers do. There is no question but that attempts to move either or both of these symbols into national choice position would meet with resistance at the international level.

NBS INSTITUTES FOR SCIENCE AND TECHNOLOGY
INSTITUTE FOR BASIC STANDARDS   INSTITUTE FOR MATERIALS RESEARCH
INSTITUTE FOR APPLIED TECHNOLOGY

CBI 69/1/23

The ASCII is now becoming embedded in hardware, plans and publications. Resistance to changes is increasing. The major selling points of the changes currently being considered are international compatibility and restoration of the @ symbol to position 4/0. Proposing additional changes which would not only upset the international concensus so carefully developed over the past five years, but also significantly effect compatibility with earlier versions of ASCII would, I believe, have a very low probability of acceptance. For the above reasons, the suggested relocation of the Vertical Line and Overline symbols seems certain of rejection both nationally and internationally.

With respect to your comments on the use of the circumflex for NOT, it seems that confusion of this symbol with an "inverted V" if a problem, would be only of a transient nature until the "inverted V" ceased to be used. The problem would appear to be no worse than the similarity of the vertical line to the number 1, the letter l or even the exclamation point. It is true that both 5/14 (circumflex) and 7/14 (overline) are in national use positions in the ISO codes, the accompanying notes however, state that they are to be used for national characters only when 8, 9 or 10 national characters are required. Discussions at the international meetings indicate that Russia is the only country with an alphabetic requirement that extends beyond seven additional characters. It was for this reason that the circumflex and overline characters were placed in these positions. Use of the circumflex as a programming symbol would reduce the probability of substitute characters being used in its place.

The Overline in 7/14 is also in a "low probability of displacement" position, but it is not in a favorable position (columns 2-5) for printing purposes.

During the past 6 years of work on the ASCII and ISO codes, there has been very little support for including logical symbols in the character set. I recall comments during the early period of ASCII development to the effect that including only one or two such symbols would have little utility. This is not intended to reflect on the merits or demerits of your case. It is intended to indicate the opposition that would have to be overcome both from those who object to characters they value being displaced from the 59 or 60 prized positions as well as those who object to further changes.

I believe the prospects of successfully overcoming this opposition to be very unfavorable. Your letter will, of course, be distributed to the X3.2 members.

Sincerely,

L L Griffin

L. L. Griffin
Chairman, X3.2

cc: Mr. Paul Goodstat, Secretary X3
Mr. B. Faden, SHARE Administration Division Manager
Mr. P. Dorn, SHARE PL/I Project Chairman
Mr. James Tupac, SHARE Secretary
423.0
LLGriffin/bks

THE JOHNS HOPKINS UNIVERSITY
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776-7100
589-7700
AREA CODE 301

X3.2.4. /171

June 17, 1966

Mr. John L. Little
Bureau of the Budget
Executive Office Building (Rm. 552)
Washington, D. C. 20503

Dear Mr. Little:

The SHARE PL/I Project has become very interested in the standard character set since two of the graphics for the language are not included in the ASCII "Center 64".

At our last Project meeting we passed a resolution on this which has been sent to Phil Cramer. I am enclosing a copy of the resolution for I thought you would be interested in our actions.

Very truly yours,

Mary L. Douglas

Mary L. Douglas (AP)

MLD:mml

Enclosure

CBI 81/20/1

X3.2/400
June 29, 1966

COMPUTER APPLICATIONS INCORPORATED

555 Madison Avenue • New York, N.Y. 10022 • PLaza 9-1310

June 23, 1966

Mr. L. L. Griffin
Chairman, X3.2
U.S. Department of Commerce
National Bureau of Standards
Washington, D.C. 20234

Dear Mr. Griffin:

I have just read a copy of your letter of June 16 to Mr. H. W. Nelson, and find myself tongue-tied with irritation over your lack of understanding of Mr. Nelson's comment regarding the circumflex. The confusion is not one of graphical differences, but one of mathematical significances.

As a mathematician, I write A ∧ B which means A and B. As a programer ASA is asking me to write ∧B (or ⋏B) meaning not B. This problem would most definitely ⋏B of a "transient nature", ∧ the "inverted V" will most certainly ⋏ "cease to be used" by the world's mathematicians.

Yours very truly,

Herbert Van Brink

Herb Van Brink
Manager, SHARE FORTRAN Project

HVB:eab

cc: Mr. Philip Dorn
Mr. James Tupac
Mr. H. W. Nelson
Mr. B. Faden
Mr. Paul Goodstat

CBI 67/1/21?

CODE

28 June 66

①

ASA X3.2.4

Pass Out Documents.

[illegible] Only. No IBM + comment

[illegible]

Yes CDC + comment.

(All yes but McKenzie)

No Ballot Yet.

Ireland	SCM
Erdreich	Univac
McKenzie	NY Stock Exch.
Murphy	Ampex
Utman	Jug (Union Carbide)
Williams	Burroughs.

IBM NO vote

Ibes says the reasons are those of American Oil / SHARE letter.

CBI 81/20/1

Y-12 N-1 A-0 ②

Booth Motion (Kerr second)

" In connection with the approval of what is now ~~(ASCII)~~ ASA X3.4-1965, task group X3.2.4 discussed the possible placement of overline and vertical line in the center four columns, but ~~an~~ no solution compatable with other requirements could ~~acceptable compromise could not~~ be found.

~~No~~ ASCII code table has ever been officially proposed in which overline and vertical line have been placed in the center four columns. The recent proposal to use these symbols in programming languages was made by the programming community with this prior knowledge.

X3.2.4 reaffirms its previous position that the expressed desires contained in Mr. MacKenzie's "NO" vote and the related SHARE documents cannot be accommodated in ASCII without gross injustice to the balance (majority) of the universe of users involved in general information interchange, "nationally and internationally."

LUNCH

John Auwaerter re Paris TC-1 ECMA.

Meeting Last Friday in Geneva -- dope by phone

£ #

Europeans want £ in 2/3 for work in sterling ~~2/3~~ area. Also want $.

Not adverse to # in 5/12 as alternate.
British will allow £ in 5/12, since they have done it that way.

Russians would perhaps prefer # to £.
Reported that TC-1 would like both
# and £ in code, but no preference regarding 2/3 and 5/12.

introduced March 1962 to England.
Previous to that it was not found over seas

Paris ISO results now going out as Draft Recommendations. [Work done at First joint ~~ISO/CCITT~~ meeting $ of ISO/CCITT].

Clamons Motion Moore second.

"In view of the report by John Auwaerter in ECMA TC1 that there are still active discussions concerning the £ and # , ~~graphic characters~~,

X3.2.4 affirms its acceptance of the Paris ISO/CCITT agreement. However, in recognition of the previous resolution of the English manufacturers to place the £ sterling in position 5/12, X3.2.4 would not oppose the same placement for international use. In the U.S., position 5/12 shall use the \ symbol."

UNIVAC Vote Problem

Is withholding their vote.

Y 13 N 2 A ?

Resolution
on £ 5/2 and \ .

Clamons asked for reasons { Booth
Ickes.

Ickes said he could not vote YES and be consistent with the SHARE position.

Booth Wanted include a statement of "how we get there," Doesn't oppose rest of the motion.

letter

⑥

Draft For X3.2

To: C.E. Mackenzie

From: ASA Subcommittee X3.2 ~~Task Group X3.2.4~~

Subject: Programming Graphics in the 64 Character Subset of Doc. X3.2/384.

1. The communications listed below have been received. These ~~have~~ were ~~been~~ given careful study by Task Group X3.2.4 on June 28, 1966. The following resolution in regard to the proposals expressed in these communications, ~~[illegible] to these proposals~~ was drafted and approved:

See p. ②

2. As a possible manner of dealing with your problem, your Attention is called to Appendix B of Document X3.2/384 attached, and in particular to paragraph B 1.2.

28 June 1966

To: Chairman X3.V.4
From: R. Kudisch (Raymond Kudisch)
Subject: Proxy Vote

I am vesting Calvin Mooers with my proxy vote for the balance of the X3.V.4 meeting (28 June 1966).

R. Kudisch
Member X3.V.4

we must regard the desires of the programming community as being not different from those of ~~the~~ mathematicians, the chemists, the meteorologists, ~~the~~ typographic compositors, the ~~brokerage~~ ~~stock~~ ~~brokers~~, financial industry, ~~the mathematicians,~~ the linguists, ~~[illegible]~~ and many other groups whose needs are not completely satisfied by ASCII, ~~or by~~ except ~~[illegible]~~ those ~~any other single code whose primary purpose is man to man and man to machine [illegible] communication~~

Clamons says

ICT }
Bull } ASCII/63

There are ASCII computers.

X3.2/[redacted] 405
June 29, 1966

TO: ASA Subcommittee X3.2
FROM: ASA Task Group X3.2.4
SUBJECT: Resolution concerning the £ Sterling and # graphics

In view of reports that there are still active discussions in ECMA/TC 1 concerning the £ and # graphic characters, X3.2.4 took the following action on June 28, 1966:

RESOLUTION

X3.2.4 affirms its acceptance of the Paris ISO/CCITT agreement. However, in recognition of the previous resolutions of the English manufacturers to place the £ Sterling in position 5/12, X3.2.4, consistent with the position of the U. S. delegation at Paris in April 1966, would not oppose the same placement for international use. In the U. S., it is proposed to use the reverse slant symbol in position 5/12.

CBI 67/1/21

/

Mooers

30 Jun 66

①

X3 Meeting

Sept 21, 22 next meeting X3.

Members X3.

13 General Int. Group
15 Consumer Group
12 Industry Group

Redefinition of scopes X3, X4, X6

X3 advises ISO on choice:
① ECMA comp
② ASA
③ IBM

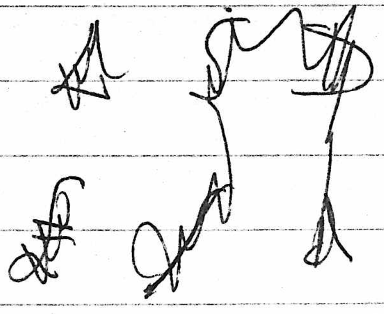
X3 withdraws 800 bpi standard & will circulate new document X3.2/407.

CBI 81/20/2

X3 ②

Dr. Nelson Re PL/I need for characters

‾ ^ ¬ ¬



Tom Steele ① X3.4 goes on record as disapprove ASCII.

② Says complete neglect of area of programming languages.

③ Quotes from X3.2/406, top paragraph of p.2.

Clemons: Overseas problem, 2×10^9 market.

There; $ # @ are used to extend the alphabet: Å Æ Ø

Also [\ ] are out, leaving 58 symb

! ^ " } are left open for re-assignment.

Steele ~~[illegible]~~ quotes Nelson ~~Bob [illegible]~~

THREAT —

Programming community will insist on ¬ | in centers set, even if it makes them non-standard.

Character Set Hostile to progr. lang. comm.

Clamons Amendment: restore "secular set" language to ASCII standard.

Mindlin

Amendment. 2/3 : Dual graphic ~~[illegible]~~ # and £
I.e. where # not needed, £ may be ~~[illegible]~~ used.

Auwaerter ¬ 7/14 become ~

^ 5/14 become ⌢ with note of meaning of circumflex and have the meaning logical ~~[illegible]~~ NOT,

~~5/14~~ can be used for circumflex

Auwaerter 7/14 ~ tilde

carried.

Griffin

X3.2 ASCII code with amendments of 30 day ballot, no publication.

23 - 4 - 1

T. Bousquet

Memorandum

FOR ALL INTERNAL COMPANY CORRESPONDENCE

1120 036

DATE July 12, 1966

COPIES TO: X3.2 Distribution List

MEMO: TRB #92
284-510

TO R. F. Clippinger

FROM T. R. Bousquet

SUBJECT X3.2 Subcommittee Meeting

An X3.2 Subcommittee Meeting was held June 29, 1966 at BEMA Headquarters, New York City.

Summary

1. Revised ASCII:

   A representative from the IBM User Groups, SHARE, GUIDE and COMMON was present. A Dr. Nelson of SHARE spoke for these groups. His problem was PL1. He claimed that ASCII could not be used by the programming people in its present form. He wanted the overline (used for Logic NOT) which appears in the position 7/14 to be moved into the middle four sticks.

   All morning and part of the afternoon was spent discussing the problem. A vote to send the revised ASCII to X3 as it stands was approved by a vote of 21(Y) 1(N) 4(A). This vote concluded the discussion.

2. Track to tape and bit to track assignment:

   The following motion approved a change of bit to track assignment on magnetic tape to bring it in line with the IBM 360. It also reaffirmed the Committee's stand on Bit 8 = 0.

   "Move that the environment to track relation (below) be included in the 800 CPI proposed American Standard

TRACK	1	2	3	4	5	6	7	8	9
Environment	E_3	E_1	E_5	P	E_6	6_7	E_8	E_2	E_4
Weight	2^2	2^0	2^4	P	2^5	2^6	2^7	2^1	2^3

and that the ASCII bit to track assigment and environment be

TRACK	1	2	3	4	5	6	7	8	9
Environment	E_3	E_1	E_5	P	E_6	E_7	E_8	E_2	E_4
Weight	2^2	2^0	2^4	P	2^5	2^6	2^7	2^1	2^3
ASCII	b_3	b_1	b_5	P	b_6	b_7	Z	b_2	b_4 "

3B1 67/2/10

August 11, 1966.

MEMORANDUM TO: SHARE Members
FROM: SHARE Standards Project
SUBJECT: Proposed 1966 Revision to the American Standard Code for Information Interchange (ASCII)

ABSTRACT: It is urgent that you make your views known promptly.

A proposed revised ASCII code has been sent to the members of ASA X.3 committee for ballot. Ballots are due in by August 26, 1966. However, ASA will not formulate its response to this ballot until approximately September 12. ASA proposes to dispense with the customary six months publication and response time, on this matter, so it is necessary to act prior to September 12, and if possible prior to August 26, in order to have an effect on the matter.

The Standards Project believes that adoption of the proposed revised Standard would be harmful to the computing community. The nature of our objections to the proposed Standard are stated in the attachment to this memorandum.

Your reaction to these views should be made known to the ASA officer responsible for formulating the consensus on this matter, namely:

Mr. Charles Phillips
Chairman, ASA X.3
Business Equipment Manufacturers Association
235 E. 42nd St.
New York City 10017

If your firm is a member of one of the organizations (such as American Petroleum Institute, Association of American Railroads, etc.) which are members of X.3, your views should also be made known to the ASA representative from that organization.

If you substantially concur with this memorandum, please feel welcome to paraphrase or include it in your letter to Mr. Phillips office and to your ASA representative.

Ben Faden
Ben Faden
SHARE Installation NG
1700 East Imperial Highway
El Segundo, California 90246

for the SHARE Standards Project

CBI 67/1/21 attachment to Haddad to Goodstat Aug 18 1966

ATTACHMENT TO SHARE STANDARD PROJECT MEMO

August 11, 1966

It is clear that, for PL/I or other advanced programming languages to be accepted as an international programming standard, it will have to meet two coding criteria:

1. Only graphics that are in the ISO 7-bit code may be used.
2. Programming symbols with syntactic meaning, such as +(plus), − (minus), = (equals), etc., should not be assigned to positions in the primary national-usage code portions of the ISO 7-bit code.

With these criteria in mind, the programming community has three criteria which ASCII itself must meet, before it can be used for PL/I.

1. The programming symbols of PL/I must be in ASCII
2. The programming symbols of PL/I must be in the center four columns of ASCII
3. Programming symbols of PL/I with syntactic meaning must not be in the code positions designated by the ISO 7-bit code for national usage namely code positions 4/0, 5/11, 5/12, 5/13, 7/11, 7/12, 7/13.

There are 59 graphics, plus Space in PL/I. With respect to 57 of these graphics, ASCII meets the three criteria.

As of June 29, ASCII failed to meet these criteria for two PL/I graphics, ¬ for logical NOT, and | for logical OR. By its actions on June 30, X3 solved half the problem, by eliminating the graphic

¬ (Overline) entirely, and recognizing that it would be valid and standard for users to require manufacturers to substitute the graphic ¬ (Overline) for the graphic ^ (Circumflex), under the graphic substitution principles of Appendix B of ASCII.

X3 also recommended that programmers accept the graphic ! (Exclamation Point) to represent logical OR, instead of the graphic ¦ (vertical line). This recommendation is not acceptable to the programming community, for reasons already set down in Mr. Herman Nelson's letter to X3.2 and to X3 as included in a recent SHARE Secretary Distribution.

If X3 will agree to one last, simple change to the proposed Revised ASCII, the final requirement of PL/I users will be satisfied, and all three of the above criteria will be met. We ask that X3 agree to interchange ! (Exclamation Point) and ¦ (Vertical line) in ASCII.

We are sure that the European programming community will accept and support a similar change to the ISO 7-bit code. In any event, we consider it necessary that this change be made to ASCII.

If X3 rejects this suggestion, and does not find it possible to meet these criteria, then X3 should be aware of the consequence, which is that ASCII will be by-passed by the programming community, and by many users and manufacturers, and fail to become a de facto standard.

X3.2/423

IBM International Business Machines Corporation

Armonk, New York 10504

Office of the Director of Technology and Engineering

August 18, 1966

Mr. P. B. Goodstat, Secretary X3
BEMA/DPG
235 East 42nd Street
New York, New York 10017

SUBJECT: Ballot X3/49 on Proposed 1966 Revision to the American Standard Code for Information Interchange

Dear Mr. Goodstat:

IBM votes "no" on the proposed revision to the ASCII.

Our vote is based primarily on the grounds that the proposal is not responsive to the expressed needs of computer users. This need was reconfirmed and made most explicit in the recent SHARE meeting (Toronto, week of August 8). A report of the SHARE Standards Project, prepared at this meeting, is attached. We consider the view of SHARE members to be highly representative of the most knowledgeable users of data processing equipment.

It should also be noted that the revised pAS and statement three of the July 15 transmittal letter do not agree with our understanding of the intent of the third resolution that was passed at the June 30 X3 meeting. We believe the resolution was meant to allow the use of position 5/14 for programming purposes and to allow graphical stylization of the character for that use as a specific assist to the programming community. In the case specifically cited by the programming representatives during the X3 meeting, position 5/14 would be used for the function of "logical not" and the shape of the character would be stylized as ¬ (sometimes called "overline"). This was also SHARE's interpretation. Unfortunately, the wording of the revised pAS is in conflict with this interpretation since the newly revised pAS still lists the "overline" function for the ~ (tilde) in position 7/14. Also there is no instruction (footnote) in the pAS on how position 5/14 may be used.

CBI 67/1/21

In essence, therefore, we would point out that if the pAS conformed to our (and SHARE's) understanding of the intent of the third amendment, it would have removed one of the two remaining defects as seen by the programmers.

We wish to reiterate our viewpoint, expressed at the June 30 meeting, that the acceptance of ASCII by computer users will hinge to a large extent on the acceptance by programmers. This follows since the program is the means to computer use, irrespective of the field of application intended.

Thus, we must vote "No" until the bona fide requirements raised by the Programming Community are satisfied.

IBM also has reservations in endorsing statement two which allows the use of £ (pound sterling) as an alternate with the # (number sign). We believe this amendment should not be incorporated until the USA has received confirmation that the solution is acceptable internationally, especially from organizations and countries such as ECMA, U.K., and Japan, which have expressed concern.

Sincerely yours,

JAHaddad

J. A. Haddad, IBM Director
of Technology and Engineering

JAH:nt

cc: Members of X3 Sectional Committee

R.B.CURRY, CHW

BRIEF SUMMARY - 66 SEP 13 X3 MTG

REVISED ASCII THRU ACCELERATED PRØCEDURES IN ØRDER TØ REPLACE VERSIØN ASA WAS HØLDING WITH A NEW ØNE IDENTICAL TØ THAT APPRØVED IN PARIS BY SC2 ØF TC97 IN 66 APRIL (SEE MY REPØRT THAT MTG). LARGE SCREAMS FRØM PRØGRAMMING CØMMUNITY, MØSTLY SHARE ABETTED BY IBM, THAT PRØGRAMMING CØNSIDERATIØNS FØR A WIDELY-USED LANGUAGE (PL-I) WERE IGNØRED. SHRE REPRESENTATIVE AT MEETING, B. FADEN, REFUSED ANY TYPE ØF CØMPRØMISE WHICH X3.2 HAD READY. MANY LETTERS IN HAND WITH ALMØST IDENTICAL WØRDING, ØBVIØUSLY A PØLITICAL PLØY. X3 WAS INCENSED AT INTRACTABILITY, AND TØØK MY EVIDENCE THAT THEIR NEEDS HAD BEEN CØNSIDERED AS FAR BACK AS MAY 62, AND SENT IT THRU TØ ASA AS A REVISED STANDARD. VERY IMPØRTANT TØ NØT UPSET INTERNATIØNAL APPLE CART, AS CCITT ALREADY REFERS TØ THIS VERSIØN AS THEIR LPHABET NUMBER 3, REQUIRES APPRØVAL ØF 19 DEPARTMENTS ØF STATE, NØT JUST ISØ AND NATIØNAL STANDARDS BØDIES. I BREATHED SIGH ØF RELIEF.

PRØPØSAL ØN FLØØR TØ ADØPT ENVIRØNMENT AS B8=0, CØNSISTENT WITH PRØPØSED MAG TAPE STANDARD. IBM, WHØ HAD FAILED BØTH IN THE ØRIGINAL B8=0 AND THEN IN THE ECMA CØMPRØMISE, TRIED NEW TACTICS, PERSUADING WALTER CARLSØN ØF D.Ø.D. THAT EMBØDYING IN MAG TAPE STANDARD AUTØMATICALLY DEFINED ENVIRØNMENT IN ALL MEDIA, AND THIS TØPIC HAD NØT BEEN FULLY CØNSIDERED AT THIS TIME. J. HADDAD ØF IBM PUSHED THIS ARGUMENT, ALTHØ X3.2 HAD IN FACT CØNSIDERED, BUT ØN ØWN INITIATIVE AND NØT BY X3 DIRECTIVE, THEREFØRE INVALIDATED. MUCH RGUMENT AND PRØPØSAL BY UNIVAC MAN THAT CØDE BE UNIQUELY ASSIGNED FØR ANY ENVIRØNMENT, PØINTING ØUT THAT HØLLERITH CARD CØDE BY NØ MEANS HAD TØ STICK TØ THE ENVIRØNMENT PRESUMABLY DEFINED BY MAG TAPE STANDARD. MØRE ØR LESS AGREED, LIKE MØTHERHØØD, AND MAG TAPE DØCUMENT SENT ØUT FØR 3-MØNTH LETTER BALLØT.

DØUBT GENERATED BY CARLSØN WAS ØBVIØUSLY SHARED BY MANY MEMBERS WITH LESS TECHNICAL KNØWLEDGE ØF WØRK. I PREDICT IT WILL NØT PASS ØN LETTER BALLØT. I BRØUGHT UP FACT THAT ECMA CØMPRØMISE DID NØT NECESSARILY RESTRICT B8 TØ ZERØ. IT CØULD ALSØ BE 1. I SAID - "WITHØUT CØMMITTING IBM--" (LAUGHS) "IT SEEMS THAT IBM HAS ALWAYS BØGGLED ØN THE CØDES BUILT INTØ 360 HARDWARE FØR THEIR EDIT CØMMANDS. B8=1 SHØULD ALLØW A GRACEFUL CØMPRØMISE." MINDLIN ØF NCR ASKED HADDAD IF THEY HAD STUDIED THIS, AND HADDAD ØF CØURSE REPLIED NØ (PRØBABLY UNTRUE, SINCE I BRØACHED THE PØSSIBILITY BECAUSE I HAD HEARD THAT IBM MIGHT CØNCEDE ØN THIS BASIS). MINDLIN ASKED WØULD THEY STUDY IT. HADDAD SAID NØ, BECAUSE THE B8=0 VERSIØN HAD ALREADY BEEN APPRØVED FØR LETTER BALLØT.

RATHER THAN WAIT FØR 3-MØNTH BALLØT TØ SHØW FAILURE, AND THEN CAST ARØUND FØR CØMPRØMISES, I AM PUSHING (WITH MINDLIN) FØR X3.2 TØ TAKE IT UP AS FAST AS PØSSIBLE AND BE PREPARED FØR THIS EVENTUALITY. HAVE TØLD PHILIPS AND GØØDSTAT ØF THIS PLAN. I DREW DIAGRM FØR X3 TØ INDICATE THAT ANY INDECISIØN AT THIS TIME WØULD GUARANTEE IBM EBCDIC CØDE A WINNER. SETTING BIT TØ ØNE IS JUST PASSIVE ELECTRØNIC INVERSIØN, BY NØ MEANS SUCH A DISASTER AS HAVING EBCDIC WIN, WHICH WØULD CLØBBER THE 140 AND ØTHER PRØDUCTS.

BELIEVE I HAVE BEEN LARGELY INSTRUMENTAL IN WINNING ØVER IBM IN BIT ØRDER ØF TRANSMISSIØN AND IN ECMA CØMPRØMISE. FEEL THAT THIS CAN ALSØ BE A WINNER AT B8=1. MUST TAKE A LØT ØF CAREFUL PLANNING TØ ENSURE, AND I BELIEVE I HAVE THE BEST RESØURCES WITHIN G.E. THEREFØRE PLAUSIBLE FØR ME TØ TAKE PUENTE'S SEAT ØN X3 AS I TØLD YØU, AT LEAST FØR THIS CRITICAL PERIØD.

ØTHER BUSINESS ØF MUCH LESSER CØNSEQUENCE AND NØT CØNTRØVERSIAL ØR DANGERØUS TØ US.

R.W.BEMER

NMAH 310/6

X3.2/465
Nov. 25, 1966
X3.2D/7
Nov 3, 1966

October 4, 1966

TO : ASA Subcommittee X3.2

FROM : L. Richard Turner

SUBJECT: ASCII and the IBM System/360

I. Introduction

At the Spring Joint Computer Conference in May 1966, the chief design engineer for the SIGMA 7 computer (Scientific Data Systems, Inc.) flatly stated his opinion that "ASCII is dead." It is known that IBM is giving thought to disabling the effect of the control bit in their System/360 that differentiates between ASCII-8 and EBCDIC for decimal arithmetic.

Whether or not the preceding statements are meaningful to the ultimate future of ASCII they do have bearing on its short-term acceptability despite the fact that ASCII has many advantages to the user and especially to the users of the small machines.

It is true nevertheless that features of the design of the IBM System/360 have the effect that the $b_8=0$ assignment of ASCII cannot be used in the machine and that IBM's own choice of ASCII-8 is scarcely less objectionable. The probable result of these difficulties is that customers will be unwilling to use ASCII despite its other advantages.

We note that although they might well have done otherwise, both the SIGMA 7 and RCA's Spectra 70 series include the same design features with respect to ASCII that cause difficulty in the System/360.

It is my intent in this presentation to describe the nature of the difficulties with the hope that some assignment of ASCII to an 8-bit code structure can be found which will not act to prevent its adoption. My proposal, which was first made in January 1966, to consider the assignment $b_8=1$ may not be a solution and in fact there may be no solution that is acceptable.

II. IBM's problems with ASCII

The principal difficulty with $b_8=0$ ASCII is that neither the EDIT commands or the commands of the decimal arithmetic option work properly. The same difficulty exists with decimal arithmetic with IBM's choice of ASCII-8 because of the nearly universal practice of using unsigned numeric fields in source data.

The difficulty with $b_8=0$ ASCII is that three characters in System/360 and four in the SIGMA 7 have a dual meaning both as reserved internal control codes and as ASCII characters as follows:

CBI 67/1/21

Code	Name	ASCII Graphic
0010 0000	Digit select	space
0010 0001	Significance start	!
0010 0010	Field separator	"
0010 0011	Immediate significance start (SIGMA7)	#

In the System/360 the coincidence between the internal codes and the ASCII graphics makes it impossible to use the EDIT command to generate an output format in which short strings of decimal digits are separated by spaces. The significance start code could be used as a replacement for digit select but with this choice the function of the EDIT command to delete initial zeros or to replace them with asterisks (used for checks) is lost.

In the case of the SIGMA 7 the field separator code is automatically replaced by the code 0100 0000 which is the graphic @ in b_8=0 ASCII. This sort of situation may be one of the reasons why SDS also feels that the use of any code other than EBCDIC should be handled only by a full translation to and from EBCDIC.

The b_8=0 assignment of ASCII and IBM's choice of ASCII-8 both cause difficulty with the decimal arithmetic option on System/360 and with the SIGMA 7. Because the b_8=0 ASCII assignments use only columns 0-7 of the tableau the PACK instruction in System/360 produces a packed form that is not acceptable for the execution of decimal arithmetic. In the case of ASCII-8 because the decimal digits are assigned to column 5 the same difficulty occurs with an unsigned decimal field.

In the case of the SIGMA 7 the "unallowed sign code" situation is detected as a part of an attempt to execute the PACK instruction. The PACK instruction is not completed and an optional trap occurs. The choice as to the option is not directly under the control of the problem programmer.

In the System/360 a wrong type of sign or digit code causes the operation to be suspended with the following note: "The result data and the condition code are unpredictable and should not be used for further computation." (page 40 of IBM form A22-6821-2, February 1966.)

These are curable difficulties but at the cost of storage space for extra commands or translation tables and perhaps even of important amounts of execution time.

As an example, the difficulty can be avoided in the System/360 by the use of one extra command (a translate command) for each PACK instruction. This requires 48 bits or 6 bytes of store. The required table size depends on whether the translation is done before the PACK instruction or afterward and on how clever it is possible to be in placing the table in the store. For the two assignments the minimum lengths are:

Assignment	Translate First	Translate Last
b_8=0 ASCII	58 bytes	136 bytes
ASCII-8	90 bytes	144 bytes

A difficulty of translation before packing is that the structure of the source data is changed in store. The programming implications of this fact are quite unpredictable and it seems unlikely that the choice of translation before packing would not be acceptable unless the translation were done for an entire record before any processing was attempted rather than as a part of the detailed computation. As painful as it might seem it is not clear that a general program other than a full translation of every character can be written. It may not even be possible for a single problem type.

Estimates of the cost in microseconds per bytes and bytes per second are given below for full translation using an 80 character field and one-fifth translation for various models of System/360:

	Full		One-Fifth	
Model No.	Microsecond	Byte Rate	Microsecond	Byte Rate
30	7.51	1.33x10^5	48	1.04x10^5
40	6.47	1.55	23.75	2.11
50	4.58	2.18	11.25	4.44
60	3.73	2.68	8.90	5.62
62	2.51	3.98	5.81	8.61
70	1.45	6.90	5.4	9.26

Curiously it turns out that on the model 30 full translation is less costly than the one-fifth translation used in the estimate.

It is noted that any required translation in the SIGMA 7 must precede packing.

III. Other ASCII assignments

The most obvious candidate for a different assignment of ASCII in an 8-bit environment is to set b_8=1. This assignment eliminates all of the machine detectable faults in decimal arithmetic of the System/360. It has, however, one undesirable feature aside from the location of the space code near the middle of the tableau.

This difficulty is that an unsigned decimal field acts as a negative number rather than its usual interpretation as a positive number.

To correct this difficulty it would be necessary for IBM and other manufacturers who may have included provisions for ASCII-8 in machine designs to change the four bit code 1011 to mean plus instead of minus and to change the generated zone code in the UNPACK instruction for ASCII from 0101 to 1011.

IBM's ability and desire to make these changes is unknown but it is known that IBM engineers have considered an ASCII assignment with exactly these requirements. It is also not known what impact it might have on other manufacturers and their customers.

There are many other possible mappings of eight "sticks" of ASCII in to a 16-stick tableau. The total number is 518, 918, 400 and it is, of course, hopeless to consider very many. We have, however, the situation that the two assignments which have been publicly considered are undesirable if considered in the light of the impact of their use on IBM System/360 customers. It is, therefore, hoped that some assignment can be found which is reasonable from the basic criteria of ASCII and which will make it possible for IBM and other computer manufacturers to come aboard.

L. Richard Turner

L. Richard Turner

X3.2/484
Dec. 15, 1966

USA
STANDARDS INSTITUTE

United States of America Standards Institute

SECTIONAL COMMITTEE CORRESPONDENCE

Address reply to:
C. A. Phillips
Data Processing Group/BEM
235 East 42nd Street
New York, N. Y. 10017

November 21, 1966

TO: Chairman, Information Processing Systems Standards Board

SUBJECT: SHARE Executive Board objections to the proposed revision of the USA Standard Code for Information Interchange, X3.4-1965

The SHARE Executive Board, by letter of October 17, 1966, advised of the concern of SHARE with the fact that certain symbols used in some programming languages do not appear in the center 64 positions of the proposed revision of X3.4-1965 (USASCII) now before the IPSSB. The SHARE letter also protested the accelerated procedure used in processing the revision in X3.

The reason for the procedure followed by X3 in processing the proposed revision can best be understood from a brief review of the history of the USASCII.

The USASCII was first approved in June, 1963 and designated X3.4-1963. A section of the code table was left "unassigned" because further national and international work was required to complete the assignment of characters. Following a series of international meetings as well as further work in the USA Subcommittee X3.2, in January 1965, forwarded to X3 a proposed revision which completed the assignment of characters and made certain other changes for conformity with the proposed ISO 7-bit code.

Committee X3 in February 1965 accepted the proposed revision for concurrent publication and balloting.

The complete proposed revision was published in the April 1965 issue of the "Communications of the ACM."

In September 1965, X3 approved the proposed revision. Approval by the IPSSB followed and the revision became official in December as X3.4-1965.

By early 1966, discussion was underway on a joint ISO code subcommittee and CCITT (International Telegraph and Telephone Consultative Committee) Working Group meeting to resolve minor differences between the 7-bit codes proposed in the two organizations.

10 East 40th Street, New York, N.Y. 10016, USA 212 Murray Hill 3-3058

SB1 67/1/22

Subcommittee X3.2, recognizing that one change being considered would effect the X3.4-1965 USASCII, considered carefully the problem of undertaking a second revision so soon after approval of the first revision. The one significant change which seemed reasonably certain to result was particularly advantageous to the United States. Specifically this was interchange of the @ symbol and the "Accent Grave" which would restore the @ to position 4/0 in the center 64 character subset, in the same position it occupied in the X3.4-1963.

The conclusion of X3.2 was that the revision should be undertaken only if it could be completed quickly under expedited procedures. The X3 Committee was, therefore, advised of the change anticipated to result from the joint ISO/CCITT meeting scheduled for April 1966 and requested by X3.2 to authorize in advance a letter ballot if such a change did indeed result from the April joint international meeting. Committee X3 unanimously authorized such a letter ballot at the March 17, 1966 meeting. The USASI (then ASA) was requested to withhold distribution of X3.4-1965 until the results of the joint international meeting were known.

Although some additional changes in the 7-bit code tables were made at the joint international meeting, X3.2 considered them to be relatively noncontroversial and, by a ballot vote of 23 for, 1 opposed, forwarded the current proposed revision to X3 in June 1966 with the request that processing be expedited through the various standards bodies.

Committee X3 on June 30, 1966, approved a 30 day letter ballot on the proposed revision by a vote of 23 in favor, 4 opposed, 1 abstaining.

In exercising a choice on procedures to be followed the X3 members must consider, not only the time requirement of its members to establish a ballot response but the requirements of suppliers and consumers for a stable standard around which products and systems can be planned, produced and utilized. The fact that substantial investments are being made in USASCII based products and systems is well known. The X3 committee concluded that the circumstances in this instance justified use of accelerated procedures.

The concern expressed by representatives of SHARE relates to the graphics ¬ and | which have the logical interpretation of "NOT" and "OR" in some programming language applications. It should be noted that these graphics are not in the center 64 positions but are in positions 7/12 (Overline) and 7/14 (Vertical Line) in the X3.4-1965 revision of USASCII. The 1965 revision was published and processed under normal procedures. The records do not reveal any expression from SHARE of concern with the location of the graphics used for "NOT" and "OR". The same is true for the period when the U. S. Delegation was preparing for the joint international meeting in April 1966. Furthermore, none of the delegations from the 10 other nations who participated in the April joint international meeting expressed any interest or support for including symbols for logical "NOT" and "OR" in the center 64 positions of the international code tables.

The X3 Committee can comply with the wishes expressed by the SHARE Executive Board only by displacing two characters (¦) and (^), both of which were included in the X3.4-1965 as well as in this proposed revision of the USASCII.

These characters are also in the ISO, CCITT and ECMA 7-bit codes. Their removal from USASCII, to comply with the SHARE suggestion, would undoubtedly lose more support than would be gained because of the loss of international compatibility and the displacement of two characters from the center 64 positions which have had both national and international support for inclusion.

It is noted that objections are not being raised to the changes that are proposed in the code table. The objections are directed entirely to obtaining additional changes.

There seems to be no question but that this proposed revision is more satisfactory to all concerned than the X3.4-1965 version which is now in effect. This is so because of the international conformance of this revision and because of the restoration of the @ symbol, which is used extensively in data processing and to some extent in programming, to a position in the center of the code table.

Approval of this revision will, therefore, provide all concerned with a more satisfactory standard than the X3.4-1965 version, whose distribution has been withheld pending this revision.

Following this course does not preclude finding a satisfactory placement of the "NOT" and "OR" functions in the center 64 positions.

A potential solution, that has had the support of X3, X3.2 and others, is to redefine the logical "NOT" and "OR" functions to associate them with two graphics that are located in the center 64 positions. This redefinition is technically feasible since graphics with which these logical functions are usually associated also have other uses. There have been a number of indications over the past 6 months or more that such redefinition for the "NOT" and "OR" functions in programming language use was under consideration in a number of quarters.

Sectional Committee X3, with the endorsement of X3.2, supported this route to a solution by a number of actions. One was a change in the graphic shape of the "Overline" in position 7/14 to disassociate the logical "NOT" meaning from "Overline". The intent being to permit associating the NOT function with the "Circumflex" in position 5/14 (center 64).

A second action was to include in this proposed revision a statement (document X3.2/411, paragraph 6.4) as follows:

> "In specific applications, it may be desirable to employ distinctive styling of individual graphics when used for a specific purpose (e.g. logical OR and logical NOT in programming)."

Disassociating the OR function from the Vertical Line (position 7/12) would permit associating the OR function with a suitably stylized graphic in position 2/1.

Approval of this proposed revision of the USASCII does not preclude continued effort to find a satisfactory location for the NOT and OR functions both nationally and internationally.

Significant further delay in making an internationally compatible USASCII available to manufacturers and users, on the other hand, can only lead to more confusion as to what is the real USASCII.

C. A. Phillips

C. A. Phillips, Chairman
USASI Sectional Committee X3

CAP/mh
cc: V. G. Grey - USASI

30 NOV 1966 003389

ISO

International Organization for Standardization
Organisation Internationale de Normalisation
Международная Организация по Стандартизации

ISO/920

GENERAL SECRETARIAT
1, rue de Varembé
1211 GENEVA 20, Switzerland

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Cable address : ISORGANIZ

Our Ref. : ISO/TC 97 - MB

24 November 1966

Gentlemen,

DRAFT ISO RECOMMENDATION No. 1052

6 AND 7 BIT CODED CHARACTER SETS FOR INFORMATION PROCESSING INTERCHANGE

You have been called upon to vote on Draft ISO Recommendation No. 1052 "6 and 7 bit coded character sets for information processing interchange". A corrigendum concerning this Draft was circulated on 31 October 1966 under reference ISO/TC 97 - MB.

The object of the corrigendum was to align the English and French versions. In the end, it turned out that the agreements reached at the joint ISO/CCITT meeting of April 1966 had been interpreted differently by CCITT who considered the text they had presented at that meeting to have been accepted with no changes (document CCITT "Alphabet joint group, temporary document No. 4").

Inasmush as Technical Committee ISO/TC 97 has always sought agreement with CCITT, and as the outcome of the discussions of Paris were not in complete opposition with the viewpoint expressed in document No. 4 and finally retained by CCITT, the Secretariat of Sub-Committee ISO/TC 97/SC 2 deems it highly desirable for ISO to adopt a not dissimilar solution.

Hence, there is no longer any reason for the corrigendum and, to avoid any misunderstanding, the ISO Secretariat has decided to have this point approved by a separate complementary vote.

When voting on Draft ISO Recommendation No. 1052, you are therefore requested kindly to disregard clause 4.2 "Diacritical signs" and note 6 on page 7, and to use the enclosed separate ballot to vote on those items. Please send in this separate ballot together with the letter ballot for basic Draft No. 1052.

Yours sincerely,

C.H. Sharpston

C.H. Sharpston
Secretary-General

Encl.

1 new wording of
  clause 4.6 and note 6
1 letter ballot

ISO/TC 97 (Secretariat - 90) 141 E/F Corr.
24 November 1966
24 novembre 1966

DRAFT ISO RECOMMENDATION No. 1052

6 AND 7 BIT CODED CHARACTER SETS FOR INFORMATION PROCESSING INTERCHANGE

NEW WORDING OF CLAUSE 4.2 AND OF NOTE 6

PROJET DE RECOMMANDATION ISO № 1052

JEUX DE CARACTERES CODES A 6 ET 7 ELEMENTS POUR L'ECHANGE D'INFORMATION ENTRE MATERIELS DE TRAITEMENT DE L'INFORMATION

NOUVELLE REDACTION DU PARAGRAPHE 4.2 ET DE LA NOTE 6

Page 7, Note 6

The graphics in positions 2/2, 2/7 5/14 have respectively the significance of "quotation mark", "apostrophe" and "upwards arrow"; however, these characters take on the significance of "diaeresis", "acute accent" and "circumflex accent" diacritical signs when they are preceded or followed by the "backspace" character.

Les symboles graphiques qui figurent aux positions 2/2, 2/7, 5/14 signifient respectivement "guillemet" , "apostrophe" et "flèche en haut"; cependant, ces caractères prennent la signification des signes diacritiques "tréma", "accent aigu" et "accent circonflexe" lorsqu'ils sont précédés ou suivis d'un caractère "retour arrière".

Page 10, 4.2

It should be noted that these symbols take on their diacritical significance only when they are preceded or followed by the "backspace" character; for example, the symbol corresponding to the code combination 2/7 (') normally has the significance of "apostrophe", but becomes the diacritical sign "acute accent" when preceded or followed by the "backspace" character.

Il convient de noter que ces symboles ne prennent leur signification diacritique que lorsqu'ils sont précédés ou suivis d'un caractère "retour arrière"; par exemple, le symbole qui correspond à la combinaison de code 2/7 (') signifie normalement "apostrophe" mais se transforme en signe diacritique "accent aigu" lorsqu'il est précédé ou suivi du caractère "retour arrière".

X3.23/158
Dec 2, 1966
X3.2.4/193
X3.2/475

PROPOSED COMPROMISE BETWEEN ASCII, EBCDIC and PL/1

The requirement that "Hollerith" punched cards be standardized demands that ASCII and EBCDIC be in one-to-one correspondence. Further, a segment of the programming community demand certain concessions. This paper presents a solution which fulfills these requirements and at the same time does not disturb international agreements and requirements.

Here are the rules for the jig saw puzzle:

> There shall be a standard contiguous subset of 64 graphics of ASCII.
>
> There shall be a proper subset of 64 graphics in EBCDIC.
>
> The subset of 64 graphics of ASCII and EBCDIC shall relate in one-to-one correspondence.
>
> The 96 graphics of ASCII shall be in one-to-one correspondence with EBDIC.

Dual assignment of graphics in either of the codes shall be avoided; if introduced they shall be identical in both sets. A dual graphic which is assigned to one code must also appear in the other; it must not ever appear again in any other place in either of the two code tables, even if the code table is expanded in the future (homomorphism).

2.1 7-Bit set table

				b_7	0	0	0	0	1	1	1	1
				b_6	0	0	1	1	0	0	1	1
				b_5	0	1	0	1	0	1	0	1
Bits b_4	b_3	b_2	b_1	Column / Row	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	(TC_7)DLE	SP	0	@ ③)	P	\` ④)	p
0	0	0	1	1	(TC_1) SOH	DC_1	!	1	A	Q	a	q
0	0	1	0	2	(TC_2) STX	DC_2	" ⑥)	2	B	R	b	r
0	0	1	1	3	(TC_3) ETX	DC_3	£ ②) ⑦)	3	C	S	c	s
0	1	0	0	4	(TC_4) EOT	DC_4	$ ②)	4	D	T	d	t
0	1	0	1	5	(TC_5) ENQ	(TC_8)NAK	%	5	E	U	e	u
0	1	1	0	6	(TC_6) ACK	(TC_9)SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	(TC_{10})ETB	' ⑥	7	G	W	g	w
1	0	0	0	8	FE_0 (BS)	CAN	(	8	H	X	h	x
1	0	0	1	9	FE_1 (HT)	EM	)	9	I	Y	i	y
1	0	1	0	10	FE_2 (LF) ①)	SUB	*	: ⑧)	J	Z	j	z
1	0	1	1	11	FE_3 (VT)	ESC	+	; ⑧)	K	([) ③)	k	③)
1	1	0	0	12	FE_4 (FF)	IS_4 (FS)	,	<	L	③)	l	③)
1	1	0	1	13	FE_5 (CR) ①)	IS_3 (GS)	—	=	M	(]) ③)	m	③)
1	1	1	0	14	SO	IS_2 (RS)	.	>	N	④) ⑥)	n	‾ ④) ⑤)
1	1	1	1	15	SI	IS_1 (US)	/	?	O	_	o	DEL

① The controls CR and LF are intended for printer equipment which requires separate combinations to return the carriage and to feed a line.

For equipment which uses a single control for a combined carriage return and line feed operation.

- in the 6-bit set table, the function F_2 will have the meaning of " New Line " (NL). F_8 will then have the meaning of " Backspace " (BS);
- in the 7-bit set table, the function FE_2 will have the meaning of " New Line " (NL).

These substitutions require agreement between the sender and the recipient of the data.

The use of this function " NL " is not allowed for international transmission on general telecommunication networks (Telex and Telephone networks).

② For international information interchange, $ and £ symbols do not designate the currency of a given country. The use of these symbols combined with other graphic symbols to designate national currencies may be the subject of other Recommendations.

③ " Reserved for National Use ". These positions are primarily intended for alphabetic extensions. If they are not required for that purpose, they may be used for symbols and a recommended choice is shown in parentheses in some cases.

Some restrictions are placed on the use of these characters on the general telecommunication networks for international transmission.

④ These three positions are normally provided for the diacritical signs " circumflex ", " grave accent " and " overline ". However, these positions may be used for other graphical symbols when it is necessary to have 8, 9 or 10 positions for national use.

⑤ For international information interchange, this position is used for the graphical symbol — (overline), the graphical representation of which may vary according to national use to represent ~ (tilde) or another diacritical sign provided that there is no risk of confusion with another graphical symbol included in the table.

⑥ The graphics in positions 2/2, 2/7, 5/14 of the 7-bit set table have respectively the significance of " quotation mark ", " apostrophe " and " upwards arrow "; however, these characters take on the significance of " diaeresis ", " acute accent " and " circumflex accent " diacritical signs when they follow the " Backspace " character.

⑦ In countries where there is no requirement for the symbol £ the symbol # may be used in position 2/3 of the 7-bit set table.

⑧ If 10 and 11 as single characters are needed (for example, for Sterling currency subdivision), they should take the place of " colon " (:) and " semi-colon " (;) respectively. These substitutions require agreement between the sender and the recipient of the data.

On the general telecommunication networks, the characters " colon " and " semi-colon " are the only ones authorized for international transmission.

⑨ Either of the two sets of three symbols shown in these positions in the table may be chosen; the interpretation of the corresponding combinations requires agreement between the sender and the recipient of the data.

The ISO Draft proposal (left) is the invariable. The thought of changing it even slightly should be banned since the tedious process to agreement may delay further action by years.

Proposed USA STANDARD CODE FOR INFORMATION INTERCHANGE

b7 b6 b5 → Bits					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b4 ↓	b3 ↓	b2 ↓	b1 ↓	Column → Row ↓	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	|
1	1	0	1	13	CR	GS	–	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	_	o	DEL

alternate graphic |

alternate graphic ¢

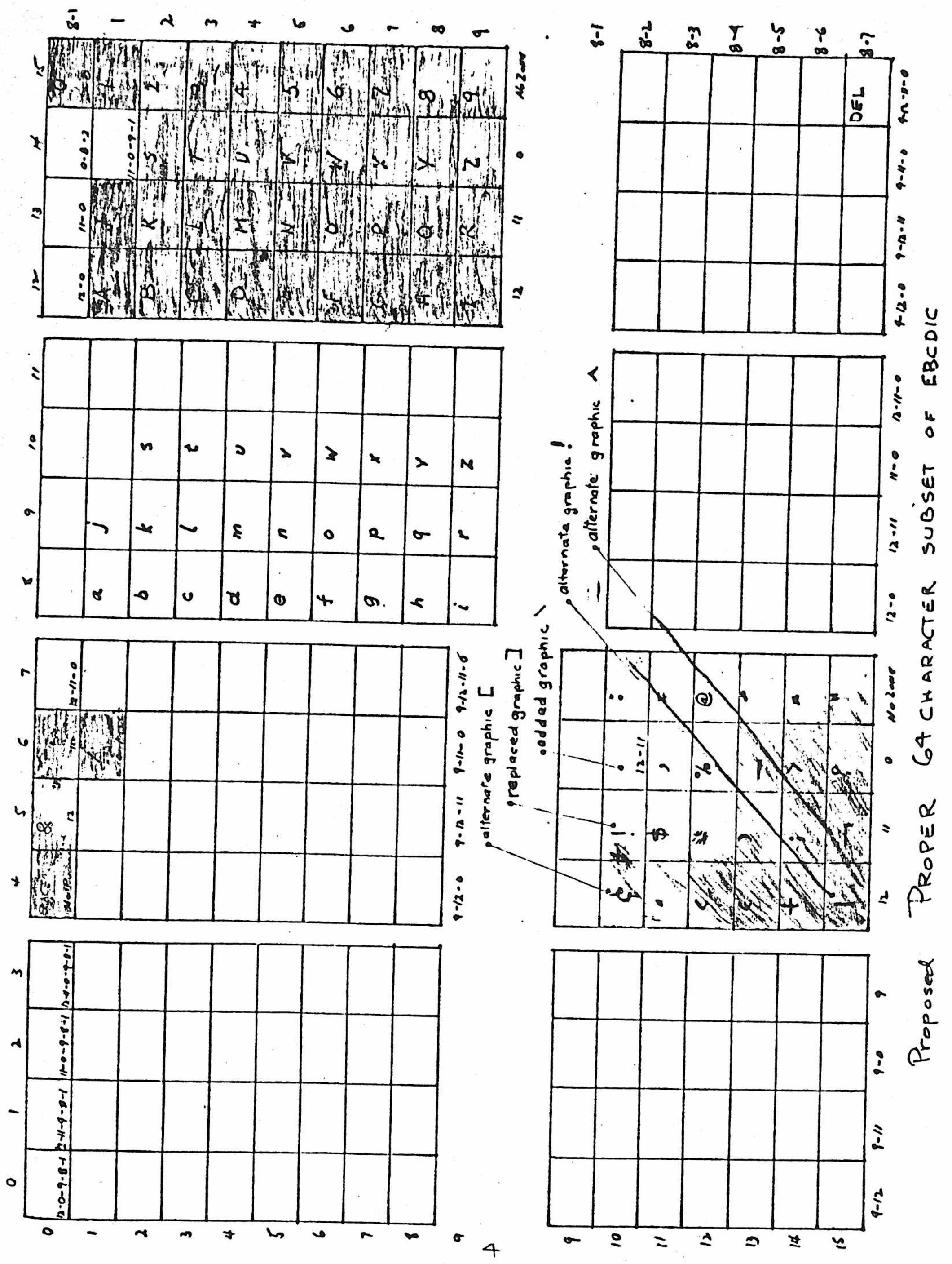
alternate graphic ¬

replaced graphic ¦

ASCII is a dialect of the ISO code. The national choice graphics are not as inflexible as those of the ISO code.

Three alternate graphics are shown. They bring ASCII into one-to-one correspondence with EBCDIC and PL/1. Paragraphs 6.4, B1.2 and section B2 apply to the alternate graphics; they are merely a precaution to the user that in some systems mixed graphic representation of a particular code may appear and assure him that none of the graphics will ever be assigned two different codes.

In line with these admonitions and promises the vertical bar now in position 7/12 must be replaced. The symbol ¦ has been suggested.



Proposed PROPER 64 CHARACTER SUBSET OF EBCDIC

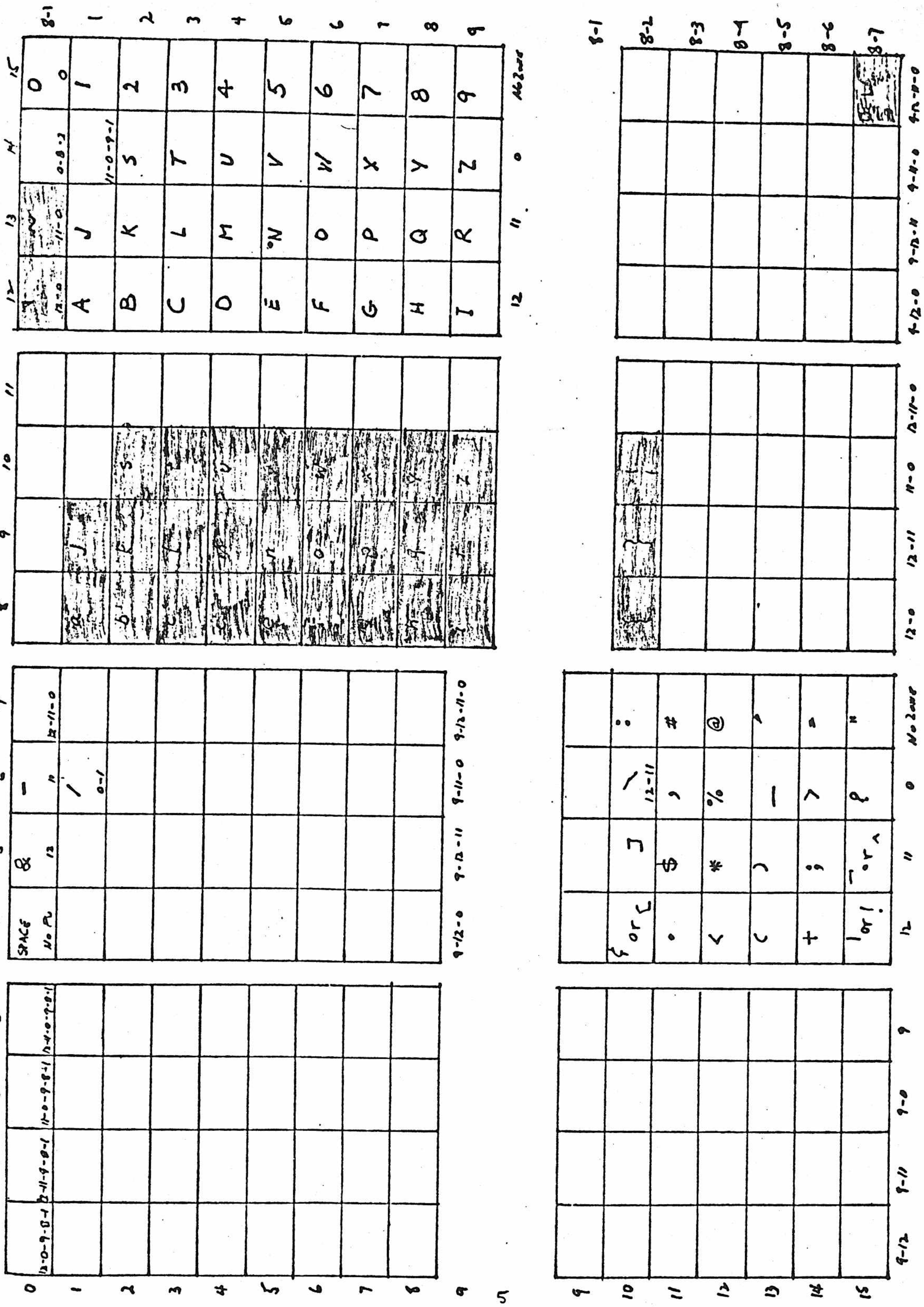
EBCDIC is an IBM Corporate Standard which has been adopted by some of the other producers. Since it is not being standardized formally its molding to fit a compromise solution depends on the good will of the producers affected. Users can mediate and encourage such changes as are reasonable and absolutely necessary.

The shaded area represents a proper 6-bit subset of ASCII (the low order 6-bits of an 8-bit byte). The five areas of possible compromise are suggested.

EBCDIC contains 60 graphics of the center four columns of ASCII; three graphics of EBCDIC are not (¢|¬). These 63 graphics form a proper subset of EBCDIC.

The assignment of alternate graphics, ¢ for [, | for ! and ¬ for ^ brings the common graphics to 62 (! is now a dual of |).

Replacing ! by] and adding \ to the position shown one obtains a proper subset of 64 characters of EBCDIC which is in one-to-one correspondence (codewise) with ASCII.


SPACE
&
-
/
¢ or [
.
<
(
+
| or !
]
$
*
)
;
¬ or ^
\
,
%
_
>
?
:
#
@
'
=
"
A B C D E F G H I
J K L M N O P Q R
S T U V W X Y Z
0 1 2 3 4 5 6 7 8 9
a b c d e f g h i
j k l m n o p q r
s t u v w x y z
{
}
12
11
0
No Zone
12-0
11-0
12-11
12-11-0

Proposed 96-CHARACTER SUBSET OF EBCDIC

The remaining characters of ASCII are assigned to EBCDIC as shown. The graphics [ ] \ are paired with { } ¦ ; in international use they are paired alphabetic extenders. These characters are placed for consistency within EBCDIC.

The grave accent and tilde are assigned to the location of the 12-0 and 11-0 punched card codes to ensure that EBCDIC graphics are assigned to all BCD card codes.

MINUTES OF MEETING NO. 30
X3.2.4
CODE DEVELOPMENT

DATE: December 12-13-1966
PLACE: BEMA Headquarters, New York, N.Y.
PRESIDING: J. L. Little - Chairman

ATTENDANCE

Name	Affiliation	Status	December 12	December 13
R. J. Donahue	Mergenthaler Linotype	M	X	X
J. K. Nelson	Western Union	M	X	
W. F. Huf	Navy	M	X	X
H. F. Ickes	IBM	M	X	X
E. H. Clamons	UNIVAC	M	X	X
L. R. Turner	NASA - Lewis Res. Center	M	X	X
S. Grunkorn	N.Y. Stock Exchange	M	X	
L. Avanzino	Olivetti-Underwood	O	X	X
T. Mairson	Sanders Assoc.	M	X	
R. Kudisch	Comm. Systems Inc.	M	X	X
J. B. Booth	Teletype	M	X	X
D. A. Kerr	Bell Telephone Labs.	M	X	X
C. N. Mooers	Rockford Research	A	X	X
J. L. Little	National Bureau of Standards	C	X	X
H. Hoots	Lindsay-Schaub Newspapers	M	X	X
E. S. Ferguson	Rockford Research	M		X
N. Clark	CDC	M		X
E. A. Avakian	Bunker-Ramo	M		X
R. M. Ireland	Kleinschmidt, Div. SCM	O		X
S. Erdreich	UNIVAC	M		X

1. Membership

The following change in membership was reported: Mr. Theodore Mairson, of Sanders Associates, was accepted as a member of X3.2.4.

2. Minutes of Previous Meeting

The Minutes of Meeting No. 29 was approved with the following corrections:

1. Minutes of Previous Meeting: Change the order of "Avakiar to Aviakin" to "Aviakan to Avakian".
2. Section 9, second paragraph, fourth line: Change "card table: to "code table".

3 10/6

Am AH

3. Agenda

The Agenda was approved as ammended below:

1. Membership Changes.
2. Approve Minutes of Meeting 29.
3. Review Agenda for this meeting.
4. Decide whether to join, on December 13, X3.2D (Ad Hoc Grou on Systems Considerations for Media Representation of USASCII) in whole or in part, with X3.2.4 splinter groups meeting for specific drafting tasks on code extensions or other topics.
5. Distribute Documents.
6. Review status of USASCII Revision (X3.2/411).
7. Review USASCII galley proof, if available.
7.1 SC/2 Agenda.
7.2 Delegation for SC/2 meeting.
7.3 Request from X3.2A on OCR coding.
8. Develop comment for X3.2 on X3.2D recommendation "...that X3.2.4 study the logical structuring of an 8-Bit set with gross assignment of areas for controls and graphic characters outside the embedded 7-Bit USASCII".
9. Brief report of joint X3.2.4-X3.4.2 ad hoc group on 6-Bit mapping of USASCII.
9.1 ECMA 4-Bit subsets.
10. Review letter of October 17, 1966, from B. G. Griffith, Chairman X3.3.4, on Code Extension for Communication Controls.
11. Discuss selection of a preferred assignment of the Escape domain into "standardized or reserved for future standardization" and user choice" areas.
12. Discuss selection of preferred "return to ASCII" (restore) technique.
13. Consideration of Resolution on EBCDIC and ASCII.
14. Discuss priority listing of Escape sequences to be standardized.
15. Discuss selection of standard Escape sequences.
16. Action on Items 11 through 15.

4. Decision on Joining X3.2D Meeting on December 13, 1966

The X3.2D meeting, on Dec. 13, will not be held, therefore no action on this item was appropriate.

5. Distribution of Documents

The following documents were distributed:

X3.2.4/187	ISO/TC97/SC2(ECMA-16),221, October 1966 - Draft response for Rules for the Definition of 4-Bit Subsets of the ISO 7-Bit Code for Information Interchange.

X3.2.4/188	Memorandum on OCR abstract symbols from D. A. Kerr to X3.2, Nov. 30, 1966.
X3.2.4/189	Schedule of TC97 meeting (with draft agenda attached).
X3.2.4/190	Comments on X3.2 Tutorial Paper - Code Extension in the American Standard Code for Information Interchange - by R. J. Mindlin, Dec. 8, 1966.
X3.2.4/191	ISO/TC97 141E - Draft ISO Recommendation No. 1052-6 and 7-bit Coded Character Sets for Information Processing Interchange.
X3.2.4/192	ISO/TC97/SC2 214E/F - Recording of Binary Data on 7 Track Magnetic Tape.
X3.2.4/193	Proposed Compromise Between ASCII, EBCDIC and PL/1.
X3.2.4/194	Resolution of the problem of interchange between ASCII and EBCDIC.

6. Status of USASCII Revision (X3.2/411)

P. Goodstat reported that 5 ballots of the 16 on the IPSSB have been received to date, 2 of which are negative. It was noted that 3 negative votes will defeat the standard.

7. Review of USASCII Galley Proof

The galley proof was not available at this meeting.

7.1 Review of SC/2 Agenda

Document X3.2.4/189, containing the SC/2 agenda, was reviewed. No action was required.

7.2 Delegation for SC/2 Meeting

R. Kudisch and H. Ickes tentatively volunteered to serve on the delegation. They will locate and report on ISO documents 213, 214, 221, 223, and 227 to X3.2.4 at the next meeting. E. H. Clamons volunteered later to serve on this delegation.

7.3 Review of Request from X3.2A on OCR Coding

After discussion, it was moved by D. A. Kerr and seconded that X3.2.4 reaffirms, at this time, its previous position on encoding the three OCR abstract symbols as recorded in paragraph 7 of the Minutes of X3.2.4 Meeting No. 23.

Passed: 10-0-1

8. Development of Comment for X3.2 on X3.2D Recommendation "...that X3.2.4 Study the Logical Structuring of an 8-Bit Set with Gross Assignment of Areas for Controls and Graphic Characters Outside Embedded 7-Bit USASCII"

After discussion, it was moved by J. Booth and seconded, to postpone further discussion of the X3.2D recommendation relating to an 8-bit set pending X3.2 action.

Passed: 11-0-0

9. Report of Joint X3.2.4 - X3.4.2 Ad Hoc Group on 6-Bit Mapping of USASCII

It was reported that this ad hoc group has not held any meetings to date.

9.1 ECMA 4-Bit Subsets

After a discussion of Document X3.2.4/187 it was determined that no action by X3.2.4 was required. It was recommended, however, that this item be placed on the agenda of the next X3.2.4 meeting for further discussion.

10. Review of Letter from B. G. Griffith, Chairman X3.3.4, dated Oct. 17, 1966, on Code Extension for Communication Controls

No action on this item was required. It was noted that there is agreement, at this time, between Task Groups X3.3.4 and X3.2.4 on the uniformity of rules governing both ESC and DLE sequences.

11. Discussion of Selection of a Preferred Assignment of the Escape Domain into "Standardized and Reserved for Standardization" and "User Choice" Areas.

Document X3.2.4/190 was discussed. No action was taken on this item.

12. Discussion on Selection of Preferred "Return to ASCII" (restore) Technique

Discussion on this topic was postponed to a later date.

13. Consideration of Resolution on EBCDIC and ASCII

After review and discussion of Document X3.2.4/193, it was moved by E. Clamons and seconded to send the following resolution to X3.2:

Resolved that:
Resolution of the problem of interchange between ASCII and EBCDIC and of the problems expressed in the

negative X3 ballots would require changes to ASCII (X3.2/411) and the establishment of the EBCDIC character assignment recommended on page 4 of Document X3.2.4/193.

The following changes to ASCII (X3.2/411) are recommended contingent upon the establishment of the character assignments illustrated on page 4 of Document X3.2.4/193.

1. Paragraph 6.4 changed to read:
   In specific applications it may be desirable to employ distinctive styling of individual graphics to facilitate their use for specific purposes as, for example, to stylize the graphics in code position 2/1 and 5/14 into those frequently associated with logical OR (|) and logical NOT (¬) respectively.
2. The standard changed to show the vertical line as ¦.
3. Add to A5.3: The character vertical line is shown as it is in the code table to avoid confusion with the solid vertical bar frequently used as a logical operator, which may be found in some systems as a graphic stylization of exclamation point.

Passed by roll call vote: 13-0-0

Affirmative votes:	R. J. Donahue, E. S. Ferguson, W. Huf, L. R. Turner, H. F. Ickes, N. Clark, H. Hoots, J. B. Booth, D. A. Kerr, E. A. Avakian, R. Kudisch, S. Erdreich, J. K. Nelson (proxy exercised by J. L. Little) - 13
Negative votes:	None
Abstentions:	None

It was moved by H. Ickes and seconded that X3.2.4 recommends that X3.2 forward Document X3.2.4/194, containing an editorial change, to X3 for inclusion in ASCII (X3.2/411).

Passed: 13-0-0

14. Discussion of Priority Listing of Escape Sequences to be Standardized.

After lengthy discussion, a suggestion to itemize the criteria required for nominating escape sequences for standardization resulted in the following list:

1. Facilitate human comprehension in man-machine communication.

2. Facilitate the operation of equipment by humans.
3. Generality of application within the jurisdiction of X3.2.
4. Need for additional controls.
5. Non-ambiguity.
6. Conservation of media and/or time.
7. Existing practices.
8. Simplicity of structure and design of sequences.

After further discussion the following resolution was moved by E. Clamons and seconded:

Resolved: X3.2.4 inform X3.2 that its work is completed. Except for such maintenance items as may come before it, it will remain inactive.

Passed: 7-2-0

15. Next Meeting

The next meeting of Task Group X3.2.4 is scheduled for the week of February 6, 1967 at Phoenix, Arizona.

R. J. Donahue

R. J. Donahue
Secretary Pro Tem, X3.2.4

replaced by 487

X3.2.4/194
Dec. 13, 1966
X3.2/475

Resolution of the problem of interchange between ASCII and EBCDIC and of the problems expressed in the negative X3 ballots would require changes to ASCII (X3.2/411) and the establishment of the EBCDIC character assignment recommended in document X3.2.4/193 page 4.

The following changes to X3.2/411 paragraph 6.4 ASCII are recommended:

Contigent upon the establishment of the EBCDIC character assignment illustrated in documnet X3.2.4/193 page 4:
en

1) Paragraph 6.4 changed to read:

   In specific applications it may be desirable to employ distinctive styling of individual graphics to facilitate their use for specific purposes as, for examples, to stylize the graphics in code positions 2/1 and 5/14 into those frequently associated with logical OR (|) and logical NOT (¬) respectively

2) The standard changed to show vertical line as ¦

3) Add to X3.2/411 A5.3:

   The character vertical line is shown as it is in the ~~card~~ CODE table to avoid confusion with the solid vertical bar frequently used as a logical operator, which may be found in some systems as a graphic stylization of exclamation point.

CBl 67/1/22

USA
STANDARDS INSTITUTE

United States of America Standards Institute

X3.2/491
1966 December 22

Minutes of Meeting #56 - Subcommittee X3.2 - 1966 December 14 - 15

Chairman: L. L. Griffin

Place: BEMA, New York, N. Y.

Appendices

A. Attendance List
B. Agenda
C. Document Register
D. Report of Task Group 3.2.1
E. Report of Task Group 3.2.2
F. Report of Task Group 3.2.3
G. Report of Task Group 3.2.4
H. Report of Ad Hoc Group X3.2A
I. Roll call votes

Summary

1. Accepted for 30-day ballot the proposed USAS Magnetic Tape Labels and File Structure for II (doc. X3.2/457).

2. Reaffirmed doc. X3.2/445, pUSAS Recorded Magnetic Tape for II (800 CPI, NRZI) and reaffirmed preference for E_8=0.

3 Accepted doc. X3.2/476, pUSAS Twelve-Row Punched Card Code for II for 30-day letter ballot.

4. Approved modification to pRUSASCII to show ¦ in 7/14 of the code table and to permit stylized graphics in specific applications, such as graphics in 2/1 and 7/14 stylized to those frequently associated with logical OR and logical NOT, provided negative voters in X3 would support the changes and corresponding changes would be made in EBCDIC.

5. Approved delegates and instructions to delegates to the 97/2 Meeting of Experts on Magnetic Tape Labels, January 17-19.

CMAH
3/0/6

6. Noted appointment of James L. Smith as chairman of X3.2.1 vice Greg Wilkinson who has been acting chairman, and resignation of Charles E. Mackenzie as chairman of X3.2.3, both changes effective with the next meeting.

Minutes of Meeting #56, Subcommittee X3.2, 1966 December 14-15

1. Attendance - see Appendix A

2. Minutes of Previous Meetings - not available

3. Membership Changes

The Chairman announced the following admissions to membership, with addresses as indicated:

Robert E. Laws (member)
Systems and Procedures
U. S. Steel Corporation
525 William Penn Place
Pittsburgh, Penna. 15230 Tel:

Vernon L. Thompson (alternate)
UNIVAC Defense Systems Division
Sperry-Rand Corporation
UNIVAC Park
St. Paul, Minn. 55116 Tel: 612 645-8511 ext. 3658

The following change of affiliation and address was noted:

Mr. James E. Taunt
General Learning Corporation
5454 Wisconsin Ave.
Washington, D. C. 20015 Tel: 301 657-2610 ext 23

The visitors indicated on the Attendance List were introduced.

4. Meeting Agenda - see Appendix B.

5. Distribution of Documents - see Appendix C.

6. Report of X3.2.5. J. S. Murphy

Having held three meetings in September and October in preparation of X3.2.3/457, the tape label specification, no meeting was held since the last X3.2 meeting. Comments received on X3.2.3/457 indicated the need for the following editorial change, which is being incorporated in the document:

On pages 8 and 9, under section 3.2.1 at the end of each of the three un-numbered subparagraphs headed Filed Header Label, File Trailer Label and Volume Trailer Label, add the following:

"--except as noted in sections 3.2.2 and 3.2.3."

6.1. Action on X3.2.5 Report

6.1.1 Moved by Murphy on behalf of the TG (no second required):

That X3.2 accept document X3.2/457 as modified, for 30-day letter ballot as proposed USA Standard Magnetic Tape Labels and File Structure for Information Interchange.
Passed: 20-0-1.

6.1.2 Moved by Murphy and seconded:

That X3.2 instruct delegates to the January 67 ISO Meeting of Experts for drafting proposed specifications on tape labels to support the positions expressed in document X3.2/447, USA comments on 97/2 N219 (ECMA Working Paper on Magnetic Media Labeling), and document X3.2/457, proposed USA Standard Magnetic Tape Labels and File Structure for Information Interchange.
Passed: 21-0-0.

7. Report of X3.2.6 - no meeting since last report.

8. Report of X3.2.1 - J. L. Smith for G. Wilkinson, acting chairman. See Appendix D.

The Chairman announced the appointment of J. L. Smith as chairman of Task Group X3.2.1, effective with the next meeting.

8.1. Action on X3.2.1 Report

8.1.1. J. Smith moved on behalf of the TG (no second required):

That X3.2 approve document X3.2/477, U. S. comments on 97/2 N214 as modified editorially.

Auwaerter pointed out need for re-wording to bring up to date the references to related 97/2 documents. The chairman requested Mr. Smith to edit document X3.2/477 to incorporate currently accurate references, for action later in the day. (See item 13.2 below).

8.1.2. J. Smith moved on behalf of the TG (no second required), that the following be approved:

Delegates to 97/4/1 meeting 1967 March 7-10:

C. E. Mackenzie (recommended to the Secretariat to
be chairman of WG1)
J. L. Smith (IBM)(Systems)
R. C. Kauffield (DuPont)(Tape base)
A. J. Burkhart (NSA)(Finished tape)
G. Wilkinson (Burroughs)(Tape Drives, 800 NRZ1, 1600PE, skew)
C. M. Riggle (CDC)(1600 PE)

Delegate to 97/4/1 ad hoc Group on Skew 1967 March 2-3:

G. Wilkinson

Delegate to 97/4/1 ad hoc Group on Instrumentation Tape 1967 March 1-3:

A. J. Burkhart

List of delegates approved: 21-0-0

9. X3.2.2 Report - F. W. Smith - see Appendix E.

9.1. Action on X3.2.2 Report - No action items.

10. X3.2.3 Report - C. E. Mackenzie - see Appendix F.

The Chairman reported Mr. Mackenzie's resignation as TG chairman effective after the current meeting. The resolution adopted by X3.2.3 expressing appreciation to Mr. Mackenzie for his leadership was reported, and received with approbation by the membership.

10.1. Action on X3.2.3 Report

Moved by Mackenzie on behalf of the TG (no second required):

> That X3.2 suspend its normal rule for two weeks prior submission of a standards proposal so that X3.2/476 can be considered for letter ballot.

Moved by Kerr and seconded that the motion be tabled until disposition of X3.2.4 action items. Motion to table passed: 23-0-0. (See item 11.1.2. below).

11. X3.2.4 Report - J. L. Little - see Appendix G.

11.1. Action on X3.2.4 Report

11.1.1. Moved by Little on behalf of the TG (no second required):

> X3.2.4 recommends that X3.2 forward document X3.2/475 containing an editorial change, to X3 for inclusion in pRUSASCII (X3.2/411.)

Moved by Auwaerter and seconded to amend the motion to provide for deleting portions of the attachment to X3.2/475.
Moved by Smith and seconded:

> That the main motion and the motion to amend be tabled and that the chairman appoint an ad hoc group to rewrite the proposed resolution and to report back 1966 Dec. 15. Passed: 20-0-0.

The Chairman appointed to the ad hoc group: Auwaerter (chairman), Mackenzie and Little.

11.1.2 (reference item 10.1. above)

Moved by Mackenzie and seconded, that his previous motion be removed from the table. Motion to reopen passed: 21-1-0.
Moved by Kerr and seconded:

> That the motion be amended to read: "That X3.2 suspend its normal rule for two weeks prior submission of a standards proposal and accept document X3.2/476 for letter ballot." Amendment passed: 20-0-0.

Moved by Kerr and seconded:

> That the motion be amended by appending: "---re-titled as follows: proposed USA Standard Twelve-Row Punched Card Code for Information Interchange, and edited as appropriate." Amendment passed: 18-0-2.

Amended motion passed: 20-0-2.

12. Report of X3.2A - D. H. Kerr - see Appendix H.

12.1. Action on X3.2A Report - No action items.

13. International Items not covered in Task Groups.

13.1. Moved by Kerr and seconded, that the following list of delegates to ISO/TC97/SC2 meeting in Paris 1967 March 13-16 be approved:

L. L. Griffin (NBS)	R. Kudisch (CSI)
J. F. Auwaerter (Teletype)	J. S. Murphy (Burroughs)
E. H. Clamens (UNIVAC)	J. L. Smith (IBM)
M. Cohen (NCR)	U. Weil (IBM)
H. F. Ickes (IBM)	

Delegates approved: 20-0-0.

13.2 (reference item 8.1.1 above)

Moved by J. Smith on behalf of TG 3.2.1

That X3.2 approves document X3.2/477 as modified.
Passed: 20-0-0. (Revision is assigned X3.2/483, to be distributed by mail).

14. Related Standards Activities

14.1. Griffin reported on work underway at the National Bureau of Standards in development of reference standards for magnetic tape for static and dynamic measurements. This includes reference standard tapes for instrumentation and digital uses and methods for calibration of instruments.

14.2 Griffin reported that the NBS Research Associates program is now being implemented, and introduced Mr. S. F. Buckland of CDC, who recently came aboard as a Research Associate.

14.3. A letter was sent to X3 members announcing that X3.6 has initiated development of a USA Standard for handwriting alphabetic, numeric and special characters used in data processing, and inviting contributions.

14.4 The BEMA ad hoc committee on I-O interfaces recommended to X3 that standardization work in this area be undertaken and that it be done by a separate sub-committee. X3 will act on the recommendation at its January meeting.

15. Report of ad hoc Group on Systems Considerations for Media Representation of USASCII, X3.2D. - L. L. Griffin - see document X3.2/469.

The Chairman reviewed the history of this subject and the Group's discussions. By agreement of the X3.2D members present, the minutes of X3.2D meeting #2, 1966 Nov. 3-4, which are appended to doc. X3.2/469, were amended as follows:

Para. 1. to indicate M. F. Hill present Thursday only.

Para. 4.1A to read: "Non-ambiguous recording of certain formats of packed numerics----"

Para. 4.2, second sentence to read: "It was suggested that the question of standardization of----"

Para. 6.3, ninth line to read: "The motion passed 5-3-1." (Delete the following sentence).

Page 6 of the minutes was missing from some copies. The sentence starting on page 5 should be completed with the words: "--recognized to be the only compromise likely to gain acceptance." The remaining contents of page 6 indicated that X3.2 would consider the subject in December 66, the adjournment, and the signature of J. L. Smith, Acting Secretary.

15.1. After some discussion the meeting adjourned at 7:00 PM and re-convened at 9:00 AM, December 15.

15.2. The discussion was continued in some depth. At about mid-day, Mackenzie summarized the debate as indicating the following options available, together with their essential characteristics:

Alternative #1: By X3.2 majority, go ahead with a "chosen" USASCII representation in media.

a. There is no compelling technical argument for either proposal.

b. There are obviously very important business considerations favoring each proposal.

Alternative #2: Unassigned track

Alternative #3: Track-to-environment bits assignment, the "ECMA Compromise."

a. Permits magnetic tape interchange, but not USASCII interchange.

Alternatives #2 and 3 were indicated as not acceptable in view of the history and current debate. As to Alternative #1, the $E_6 = b_7$ solution was described as internationally not acceptable and a matter of subjective evaluation.

With respect to the lack of compelling technical arguments in favor of either proposal under Alternative #1, Lazarus discussed the engineering considerations of writing "all zeros" in E_8 using NRZI recording, pointing out equipment design problems. A solution was suggested that the track might be interpreted as $E_8 = 0$ but written with "1's". It was pointed out that a frequently used technique for tape certification is to write "all zeros" on all tracks for the full lenght of tape and then to read it back, indicating the problem has been successfully handled in some designs. Another point was made that writing packed numerics would give a mixture of 0's and 1's in track 8.

15.3 Moved by Kudisch and seconded:

> That there be a roll call vote whereby each member specify his preference for one of the three proposed alternatives:
>
> a. $E_8 = 0$ (ECMA compromise)
>
> b. $E_8 = 1$ (ECMA compromise)
>
> c. $E_6 = b_7$

Moved by Murphy and seconded, to amend the motion to read:

> That there be a roll call vote whereby each member be given only a binary choice between
>
> (1) $E_8 =$ constant (ECMA compromise)

> (2) $E_6 = b_7$

The amendment passed: 22-0-0.

The roll call favored choice (1) by 16 for (1), 6 for (2), no abstentions.

15.4 Moved by Auwaerter and seconded:

> That there be a roll call vote whereby each member be given a binary choice between $E_8 = 0$ and $E_8 = 1$.

Moved by Mackenzie and seconded, to amend the motion by adding:

> and that by this vote X3.2 will be expressing a preference for the relevant 8-bit representation, either $E_8 = 0$ or $E_8 = 1$. Amendment passed: 21-2-0.

Moved by Auwaerter and seconded, to amend the motion to read:

> That there be a roll call vote whereby each member be given a binary choice between $E_8 = 0$ and $E_8 = 1$ and that by this vote X3.2 will be expressing a preference for the relevant 8 information (as opposed to 7-plus-parity) bit representation of USASCII, either $E_8 = 0$ or $E_8 = 1$. Amendment passed: 21-1-0.

Moved by Clamons (for Erdreich) and seconded:

> That the motion be tabled until after we have decided whether we wish to standardize 8-bit environments. Motion to table failed: 5-16-0.

The motion to take the roll vote passed: 22-0-0.
The roll call (see Appendix I) resulted in 18 for $E_8 = 0$, 2 for $E_8 = 1$, 3 abstentions (2 with prejudice).

15.5 Moved by Erdreich and seconded:

> In view of the action of X3.2 in reaffirming its position with respect to $E_8 = 0$ (reference previous motion), X3.2 would ask that X3 accept this action

as a most significant step in solving the "inter-relationship between the representation in all media of the graphics of 7-bit USASCII in an 8-bit environment".

The question was moved by Mackenzie and seconded. To terminate debate the vote was 15-0-2. The motion passed: 20-2-0.

15.6 Moved by Auwaerter and seconded:

> X3.2 reaffirms to X3 the contents of document X3.2/445, proposed USA Standard Recorded Magnetic Tape (800 CPI, NRZI). Passed: 20-2-1.

15.7 Mackenzie requested that the National Bureau of Standards, other testing laboratories and manufacturers of hardware submit to X3 technical reports on the implications of recording "all zeros" in a track of 9-track NRZI recorded tape.

16. (reference item 11.1.1. above, on the proposed editorial change to USASCII). Moved by Mackenzie and seconded:

> That X3.2 accept documents X3.2/485, 486 and 487.
> Motion passed: 22-0-0.

17. Next meeting. Phoenix, Ariz., 1967 February 6-9, at the Executive House, Scottsdale. Mr. M. Cohen of NCR will be the Acting Secretary.

18. The meeting was adjourned at 4:00 PM.

Robert M. Brown

ROBERT M. BROWN
Acting Secretary

Appendix A

ATTENDANCE LIST

X3.2 Meeting #56 - 1966 Dec 14-15

ME	ORGANIZATION	STATUS*	Dec 14	Dec 15
L. Griffin	NBS	Chm	X	X
J. F. Auwaerter	Teletype	M	X	X
E. A. Avakian	Bunker-Ramo	M	X	X
R. M. Brown	DOD	M	X	X
S. F. Buckland	CDC/NBS	V	X	X
E. H. Clamons	UNIVAC	C	X	X
N. Clark	CDC	M	X	X
M. Cohen	NCR	A	X	X
R. T. Dexter	TAC	O	X	X
U. C. S. Dilks	Burroughs	V	-	X
R. J. Donahue	Mergenthaler Linotype	M	X	X
S. Erdreich	UNIVAC	M	X	X
E. S Fergusson	Rockford Res.	O	X	X
D. H. George	Litton	A	-	X
H. L. Gross	Genl. Instrument	V	-	X
S. Grünkorn	NY Stock Exch.	A	X	X
M. F. Hill	CDC	L-X3.6	X	X
H. Hoots	Lindsay-Schaub Newsp.	M	X	X
W. F. Huf	U. S. Navy	O	X	-
R. M. Ireland	Kleinschmidt/SCM	M	X	X
M. R. Jepson	AT&T	M	X	X
J. J. Jetzt	AT&T	V	X	-
D. A. Kerr	Bell Tel Labs	M	X	X
J. Klapkiw	Honeywell	A	X	X
F. H. Klement	NCR	O	X	-
R. Kudisch	CSI	M	X	X
R. E. Laws	U. S. Steel	M	X	X
P. Lazarus	IBM	V	X	X
J. L. Little	NBS	M	X	X
C. E. Mackenzie	IBM	M	X	X
M. Mendelsohn	Monroe	M	X	-
C. N. Mooers	Rockford Res.	O	X	-
J. S. Murphy	Burroughs	A	X	X
J. K. Nelson	Western Union	M	X	X
P. Siegel	NCR	O	-	X
J. L. Smith	IBM	A	X	X
F. W. Smith	Western Union	A	X	-
H. Spielman	RCA	M	X	X
C. A. Sykes	GE	A	X	X
J. E. Taunt	Gen Learning Corp	M	X	X
V. L. Thompson	UNIVAC	A	X	X
L. R. Turner	LeRC/NASA	O	X	X
G. E. Williams	Burroughs	M	X	X
D. Wolf	Stone Straw Corp Toronto, Canada	V	X	-

*M-Member; A-Alternate; O-Observer; C-Consultant; L-Liaison; V-Visitor

X3.2/485
1966 December 15

Subcommittee X3.2 resolves:

In the spirit of the X3.4 San Francisco resolution of November 7, 1966 (Item 7 of the minutes of 51st meeting of X3.4) Subcommittee X3.2 wishes to advise X3 that it would not object to making the changes in the prUSASCII recommended in document X3.2/486 provided the present X3 negative voters agree to accept this recommendation and also to support final approval of the proposed standard.

Agreement to this change is based on recognition of the problems (1) that the vertical bar is used in some existing programming languages to represent "logical OR," (2) it is desirable that the "logical OR" concept be associated with a graphic character in the center 64 positions of the code table and (3) that the presence of the vertical line outside this area in the present code table might cause confusion to some users. The changes suggested provide a solution to these problems. No broader code table changes or footnotes are necessary or would be acceptable.

The intent of these changes is to enlarge the already broad international and interdisciplinary consensus represented by the present prUSASCII.

NMAH 310/67

X3.2/486
1966 December 15

X3.2 Recommendation on prUSASCII and EBCDIC

I. Pursuant to X3.2 resolution X3.2/485 the following changes to X3.2/411, prUSASCII, are recommended:

A) Change the last sentence of paragraph 6.4 to read:

> In specific applications it may be desirable to employ distinctive styling of individual graphics to facilitate their use for specific purposes as, for example, to stylize the graphics in code positions 2/1 and 5/14 into those frequently associated with logical OR (¦) and logical NOT (¬) respectively

B) Change the code table to show vertical line as ¦ in position 7/12

C) Add to paragraph A5.3:

> The character vertical line is shown as it is in the code table to avoid confusion with the solid vertical bar frequently used as a logical operator, which may be found in some systems as a graphic stylization of exclamation point.

II. It is further recommended that manufacturers implementing EBCDIC establish the EBCDIC character assignments described in X3.2/487 .

III. In order to facilitate interchange between prUSASCII and EBCDIC environments and to resolve the problems expressed in the negative X3 ballots, it is necessary that both these recommendations be implemented.

IV. By its resolution X3.2/485 , subcommittee X3.2 has expressed its willingness to facilitate interchange; the subcommittee would appreciate an expression from the manufacturers implementing EBCDIC indicating their willingness to make the complimentary changes in EBCDIC.

X3.2/487
1966 December 15

Compatibility Between prUSASCII and EBCDIC

X3.2 recognizes the desirability of simplifying the interchange of information between prUSASCII and EBCDIC environments. Simplicity is achieved by establishing a one-to-one correspondence between the two codes.

More specifically:

- A) There should be a standard contiguous subset of 64 graphics of ASCII.
- B) There should be a proper subset of 64 graphics in EBCDIC.
- C) The subset of 64 graphics of ASCII and EBCDIC should relate in one-to-one correspondence.
- D) The 96 graphics of prUSASCII should be in one-to-one correspondence with those of EBCDIC.
- E) The subset of 32 prUSASCII controls should be in one-to-one correspondence with their counterparts in EBCDIC.
- F) Dual assignment of graphics in either of the codes should be avoided; if introduced, they should be identical in both sets.

The fulfillment of these criteria permit the generation of a useful twelve row punched card code standard. The changes described in the attached tables not only conform to the above criteria, but also serve to meet the objections of certain portions of the programming community.

Attachments:

1. ISO 7 bit code table
2. prUSASCII code table suggested
3. EBCDIC code table suggested
4. Table of correspondence between nonsimilar graphics contained in the two codes

[illegible]
[illegible]